

# Identifying High-Risk areas for Untimely Administration of Hepatitis B Birth Dose (HepB-BD) in Low-Middle Income Settings: A Spatial Epidemiological approach

Jacob M Gizamba<sup>1</sup>

<sup>1</sup>Spatial Science Institute, University of Southern California, Los Angeles, California, U.S.

Regions with a high risk for delayed HepB-BD administration, defined by a prevalence of non-facility deliveries exceeding 30%, demonstrated notable geographical disparities across the country.

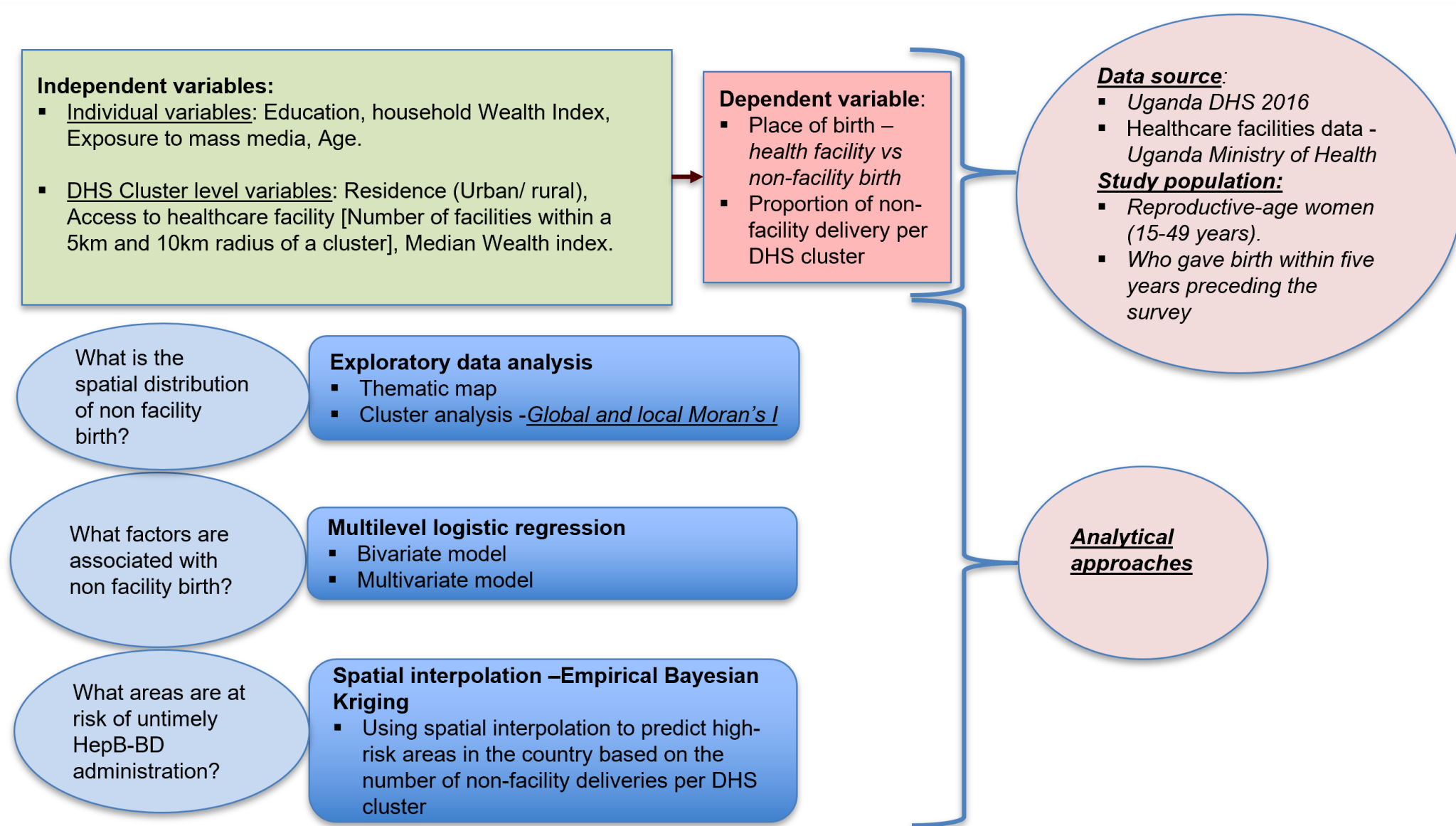
## BACKGROUND

Viral hepatitis, particularly Hepatitis B, presents a significant public health concern in Sub-Saharan Africa owing to vertical transmission from mother to child. Timely administration of HepB-BD within 24 hours post-delivery is crucial for preventing transmission and attaining the Elimination targets by 2030. However, universal adoption of HepB-BD faces substantial challenges notably pertaining to feasibility issues such as timely vaccination, inadequate prenatal care, and a high prevalence of non-facility-based deliveries.

This study sought to identify high-risk areas for untimely administration of HepB-BD by leveraging non-facility deliveries as a proxy for delayed HepB-BD administration in low-income settings.

## METHODS

A cross-sectional study was conducted using secondary data obtained from the 2016 Demographic and Health Survey conducted in Uganda. The sample included 10,263 reproductive-age women nested within 696 clusters.



### Summary of the workflow

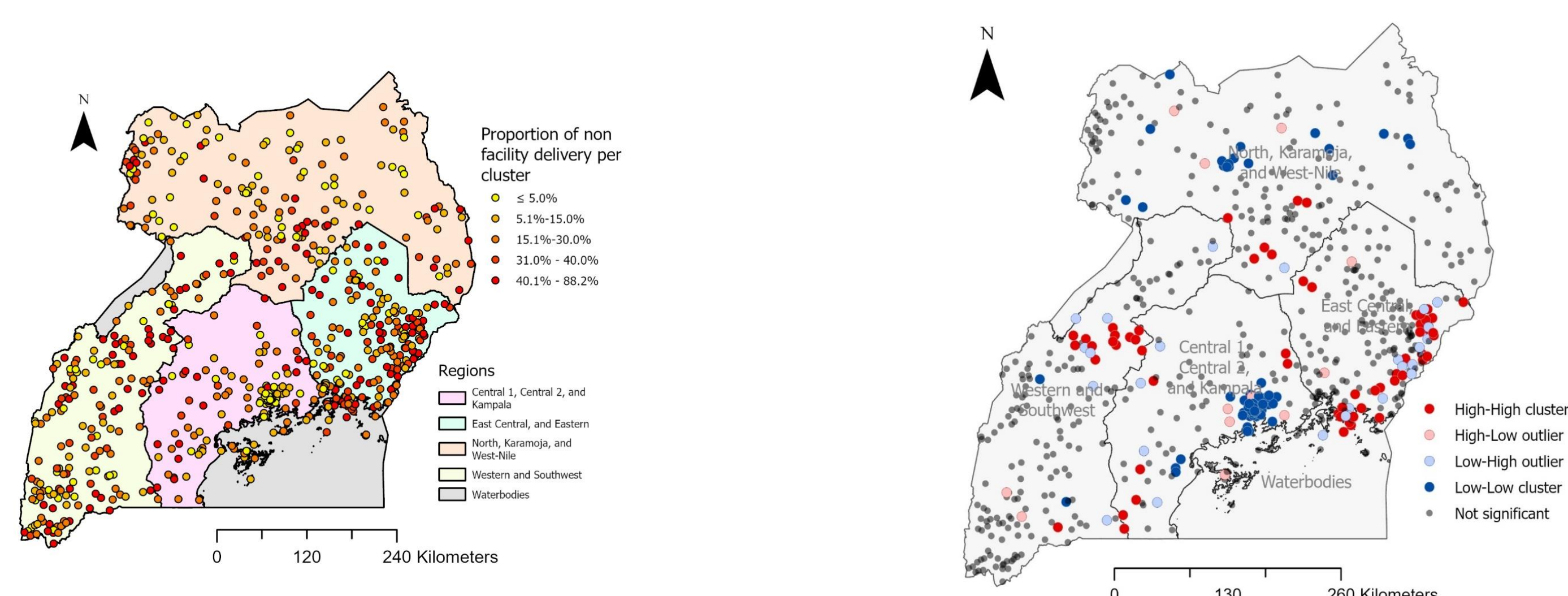
## RESULTS

Variables	Facility delivery (N=7786)	Non-facility delivery (N=2477)	Total (N=10263)
<b>Individual variables</b>			
Maternal age, Mean (SD)	28.11 (6.99)	29.86 (7.54)	28.54 (7.17)
<b>Maternal education</b>			
Secondary level and above	2432 (31.2%)	260 (10.5%)	2692 (26.2%)
Primary level and below	5354 (68.8%)	2217 (89.5%)	7571 (73.8%)
<b>Cluster characteristics</b>			
<b>Residence</b>			
Rural	5941 (76.3%)	2277 (91.9%)	8218 (80.1%)
Urban	1845 (23.7%)	200 (8.1%)	2045 (19.9%)
<b>Health facilities within 5km radius, Mean (SD)</b>	2.36 (2.46)	1.63 (1.79)	2.19 (2.34)
<b>Health facilities within 10km radius, Mean (SD)</b>	7.78 (6.32)	6.23 (5.03)	7.41 (6.07)

### Summary characteristics.

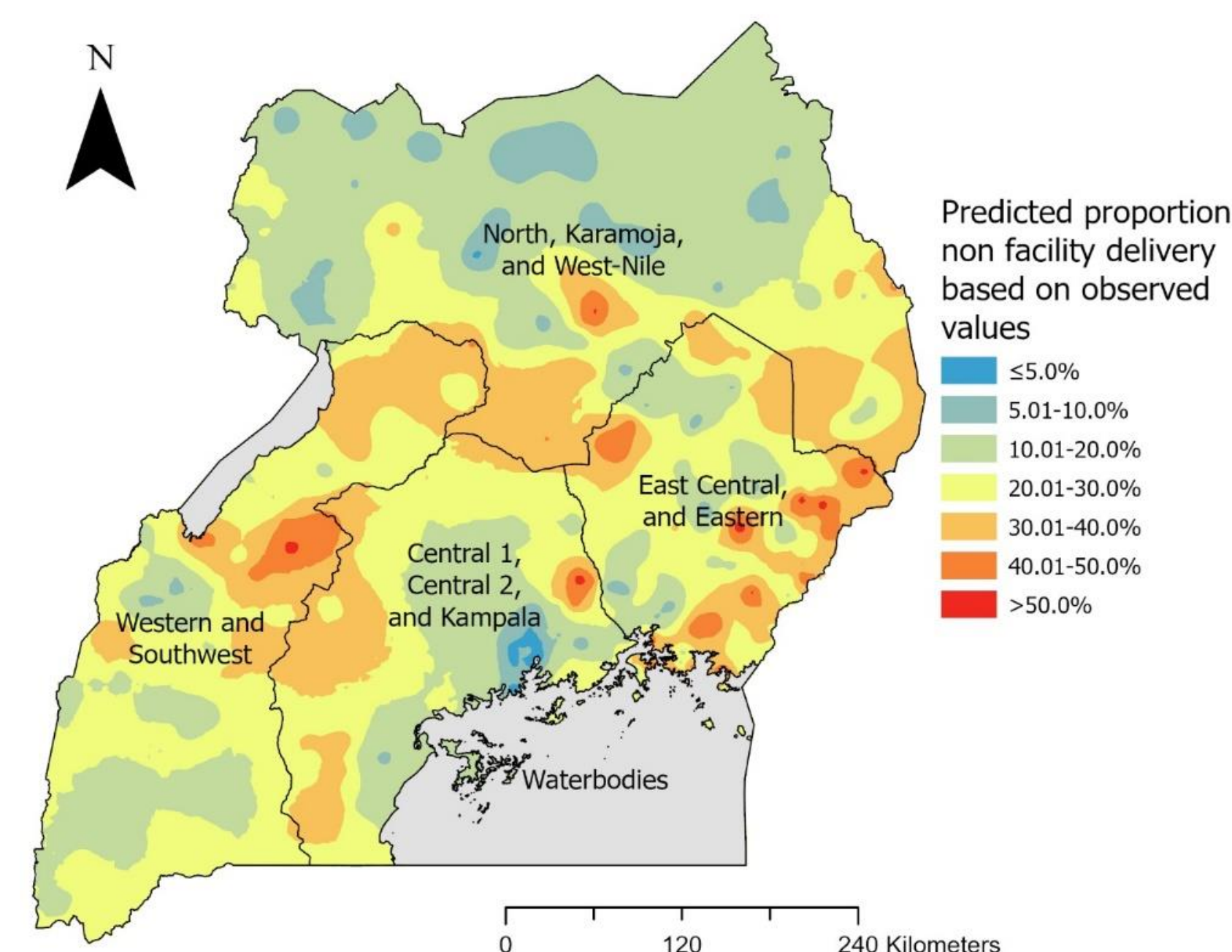
- Overall, 31.8% of the women had non-facility delivery for their most recent birth within 5 years preceding the survey

## RESULTS CONTINUED



### Distribution of the proportion of non-facility delivery across sampled clusters (Left); Hotspot analysis (Right).

- There is an observable pattern of higher prevalence of non-facility delivery (at least 30.0%) in clusters in the eastern and western regions.
- Conversely, clusters characterized by a prevalence of non-facility delivery below 5.0% were predominantly concentrated in the central region, which is primarily urban.



### Empirical Bayesian Kriging Spatial interpolation results showing the distribution of the risk of untimely HepB-BD due to non-facility delivery in Uganda.

- A higher prevalence of non-facility delivery (>30.0%) is indicative of an increased risk of untimely HepB-BD.
- A lower prevalence of non-facility delivery suggests a correspondingly diminished risk of untimely HepB-BD.
- The regions at high risk of untimely HepB-BD were primarily identified in the eastern and western regions.

## CONCLUSIONS

- The spatial variability observed in high-risk areas for untimely HepB-BD due to non-facility delivery highlights the significant impact of contextual and individual factors
- Embracing a spatial epidemiological paradigm serves as a valuable approach for informing and guiding targeted public health interventions aimed at addressing untimely HepB-BD administration in low-income settings.

## ADDITIONAL KEY INFORMATION

